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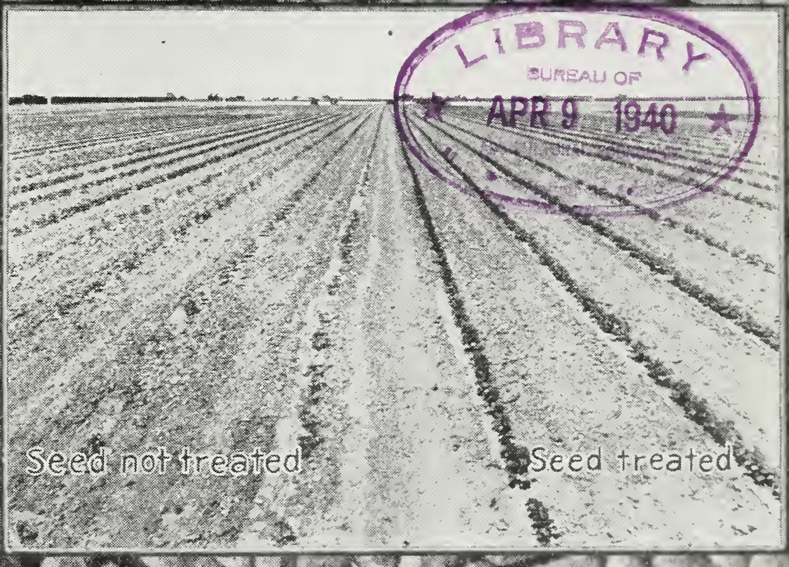
COTTONSEED TREATMENT



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COTTONSEED TREATMENT

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Failure of Seedling Cotton

Failure to get a good stand of cotton plants has been experienced by most cotton farmers. Some seasons cottonseed rots in the ground, and young plants die, so that fields have to be replanted. Failure to get a stand in some cases may be due to such things as poor seedbed preparation, faulty planting, packed soil, dry soil, etc., but in many cases it is due to a diseased condition variously known as damping-off, seedling blight, sore shin, or rot. These are names applied to decay of the seed and seedling both before and after the young plant comes through the ground.

Damping-off is caused by one or more of several different parasitic fungi or bacteria that attack the seed or seedling, either by way of the seed, where they may have been, or from the soil, where they may have passed the winter. The disease is likely to be worse under early-season weather conditions that are unfavorable for the growth of cotton, that is, low temperatures and high soil moisture.

One of the most common types of damping-off in cotton States from Arkansas and Louisiana eastward is that caused by the anthracnose fungus (fig. 1). This is also a common cause of boll rot in these States of abundant rainfall, causing small, round, water-soaked spots, which later enlarge, become sunken, and develop masses of pink fungus. The lint may be discolored and rotted. The fungus is harbored over winter on the fuzzy seed. When such infested seed is planted the parasite is likely to resume activity and rot the seed or cause dark reddish-brown cankers (sore shin) on sprouts or lower stems. These may kill the plants or simply weaken and delay them.

There are several other organisms that may cause damping-off. One of these, which is serious in several of the Southwestern States, is the angular leaf spot bacterium. It also causes leaf spots, black arm. and bacterial boll rot. These parasites may be carried on the seed, Some are also likely to be in the soil, especially if cotton was planted in it the year before.

Why Treat Cottonseed?

The objects of treating cottonseed with a dust disinfectant are:

(1) To kill any fungus or bacterial germs that may be on the outside of the seed and may become active and attack the seed after it is planted and the plant after it starts to grow.

(2) To provide a coat of toxic chemical in the fuzz and on the outside of the seed that will protect it from decay by germs that may be in the soil.

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Issued March 1940.

Beneficial results from seed treatment with certain organic mercury dusts have been obtained during the past several years in experiments and field demonstrations in several States including Georgia, North Carolina, South Carolina, Virginia, Mississippi, Arkansas, Louisiana, Texas, Arizona, and California. The North Carolina Extension Serv-

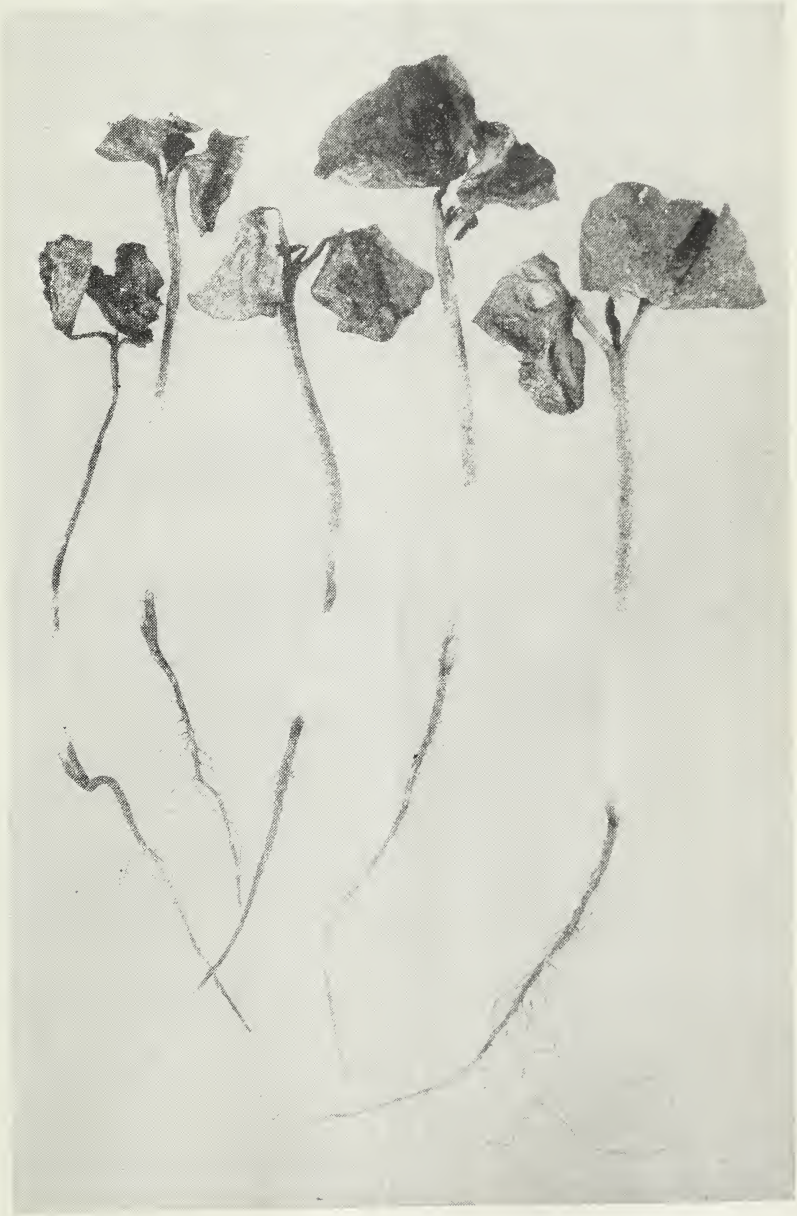

FIGURE 1.—Cotton seedlings affected with damping-off. Note decay of main roots and stems, absence of healthy fibrous roots, and shriveling of stems and leaves.

ice estimated that the average net profit an acre from treatment on 43 farms in 1936 was $13.05, and on 100 farms in 1937 was $11.27. The practice of seed treatment in that State has increased from 2,000 acres in 1934 to 7,000 acres in 1935, 24,000 acres in 1936, 200,000 acres in 1937, 450,000 acres in 1938, and about 600,000 acres in 1939. In other States the practice is also steadily being adopted. For the country as a whole, however, cottonseed treatment is still in its infancy. It is only since the advent of the boll weevil, with the consequent need for earlier planting and better stands, that the experiment stations have established more definitely the importance and the causes of damping-off and developed economical, efficient means of control.

Seed treatment may not always show improvement in stands from all seed lots nor in all seasons. Benefits will vary with different dates of planting, with the previous crop history of the field, between different fields on the same farm, or even between different locations in the same field. Furthermore, good seed obtained from early picked cotton that has not been storm damaged and has been stored and planted under favorable conditions is likely not to show much response to treatment. One-year-old seed that has been stored under dry conditions usually gives better stands than new seed, because the anthracnose fungus, which may be harbored on the seed coat and in the fuzz, does not survive long storage under dry conditions. Thus 1- or 2-year-old seed would not be expected to show so much benefit from treatment as would new seed. Many farmers make it a practice to store their seed under dry conditions for 17 or 18 months and thus avoid much anthracnose damage.

Seed treatment, however, is not expensive and may be considered as good insurance for satisfactory stands of plants (see title-page illustration). It has been found to pay big dividends, especially when seeds carry disease germs and when cold, wet spring-planting conditions prevail. Under average conditions in most cotton States seed treatment appears to be a profitable practice.

What to Treat With

The organic mercury dust, 2-percent ethyl mercuric chloride,[1] which is used at the rate of 3 ounces per measured bushel of seed, is the most widely used preparation for cottonseed treatment. However, 5-percent ethyl mercuric phosphate,[2] which is used at the rate of 1½ ounces per measured bushel, appears to be equally effective if not superior. The 5-percent dust is the standard preparation for cereal-seed treatment, and it is a convenience to have a single dust for both purposes. Do not use more than the recommended amounts of dust.

Several other dusts containing copper and zinc as well as mercury have been tried experimentally by several State experiment stations. Certain other proprietary dusts have been advertised for use on cottonseed, but none has proved very satisfactory. It appears that some of these dusts are being improved, and the various experiment stations are constantly on the alert for those that may possess advantages. Farmers should seek the advice of their county agricultural extension agents or State experiment stations as to any new materials that may come to their attention.

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[1] This dust is sold under the trade name of 2% Ceresan.

[2] This dust is sold under the name of New Improved Ceresan.

How to Treat

A home-made, rotating barrel or oil-drum mixer is a very satisfactory and inexpensive machine for mixing dust and seed under average farm conditions (fig. 2). The mixer is filled one-half to two-thirds full of seed and the required amount of dust disinfectant (3 ounces of the 2-percent ethyl mercuric chloride[3] per measured bushel or 1½ ounces of the 5-percent ethyl mercuric phosphate[3] per measured bushel) added. The door is then closed and the mixer turned slowly for about 5 minutes or until the dust and seed are thoroughly mixed.

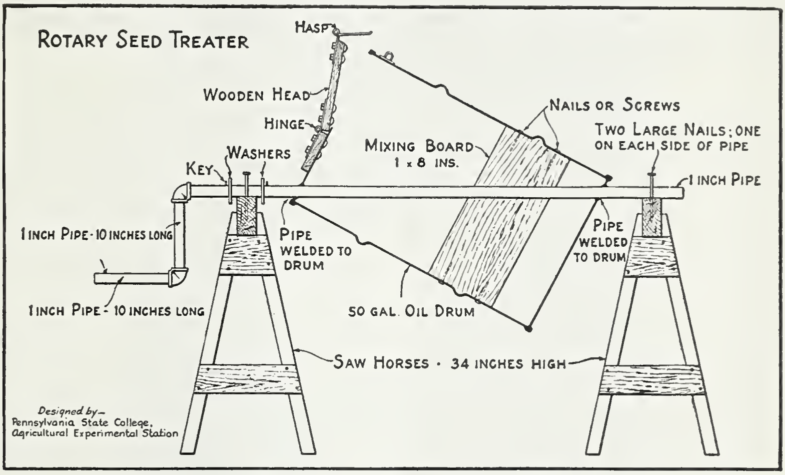
ROTARY SEED TREATER
HASP
WOODEN HEAD
HINGE
WASHERS
KEY
MIXING BOARD 1 x 8 INS.
NAILS OR SCREWS
TWO LARGE NAILS; ONE ON EACH SIDE OF PIPE
1 INCH PIPE
1 INCH PIPE - 10 INCHES LONG
PIPE WELDED TO DRUM
PIPE WELDED TO DRUM
1 INCH PIPE - 10 INCHES LONG
50 GAL. OIL DRUM
SAW HORSES · 34 INCHES HIGH
Designed by—
Pennsylvania State College,
Agricultural Experimental Station

FIGURE 2.—Rotary cottonseed treater made out of oil drum.

How to Make a Treating Machine

A 50-gallon oil drum can be used to make a good seed treater (fig. 2). Cut out half of the head and onto the remaining half bolt a board 1 inch thick by about 6 inches wide and the proper length to fit the rim of the drum. Allow about 1 inch of the cut steel to extend beyond the board toward the opening to make a dusttight joint. Now cut another piece of 1-inch board to form a semicircular cover for the opening, fitting it in snugly and hinging it onto the 6-inch bolted board. Attach a hasp to hold the door tightly closed when the machine is in use. To make the cover dusttight, felt weather stripping or old rubber inner tubing can be tacked on.

An axle can be made from a 1-inch pipe about 48 inches long, threaded at one or both ends. This is passed diagonally through the mixer, with the ends extending about 8 inches beyond each end of the drum, and welded or bolted firmly to it. A pipe turning handle is fitted onto one or both ends. A mixing board or baffle board nailed across the inside of the drum is needed to help do a good job of mixing. Mount the finished mixer on two sawhorses.

Other somewhat similar mixers can be made out of barrels or boxes.

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[3] See footnotes 1 and 2, p. 4.

Storage of Treated Seed

Storage tests show that no lowering of germination occurs when dry seed that has been properly treated with either 2-percent ethyl mercuric chloride or 5-percent ethyl mercuric phosphate is held in dry storage even for 17 months. However, since high moisture favors injury of treated seed, it is advised that seed to be treated should not have a moisture content in excess of 12 percent and that it be stored in a dry place where it will not take up moisture beyond that amount. It has been observed that treated seed is less damaged by rats, mice, and insects in storage than is untreated seed.

Cost of Treatment

The present prices of the two organic mercury dusts used for cottonseed treatment are almost the same per pound, but since one is used at 3 ounces per bushel and the other at 1½ ounces per bushel the cost of dust per bushel in the case of one is about half that of the other. They can be purchased in 1-, 5-, 25-, and 100-pound containers so that the costs of dust per bushel of seed will vary, depending on the quantity purchased, from 9½ to 14 cents in the case of one, and from 5 to 7 cents in the case of the other.

The cost per acre will depend on the rate of seeding. In general, treated seed can safely be planted at a somewhat lower rate than untreated. At a seeding rate of 5 pecks per acre and allowing a 5-cent per bushel labor charge for treatment, the cost of treatment ranges from about 12 to 24 cents an acre. For this small amount expended for treatment, many farmers have greatly increased their income by insuring a stand and improving quality and yields per acre.

PRECAUTIONS

These mercury dusts are poisonous when taken into the body either through the mouth and stomach or breathed in through the lungs. Therefore, treated seed should not be fed to farm animals, and the chemical should be kept tightly covered, in a safe place. Seed had best be treated outdoors or at least in a well-ventilated place. Care should be taken to avoid breathing any more dust than is necessary, and it is advisable to wear a dry-filter mask especially if a large quantity of seed is being treated. Operators of commercial treating machines should always wear approved dust masks and install dust-catching devices.

When moistened, these dusts, especially the 5-percent ethyl mercuric phosphate, are irritating or blistering to the skin. Therefore, avoid accumulations of dust on the skin, especially if perspiring. Thoroughly wash hands and face and exposed parts of body with soap and water. Keep dusts away from the eyes. Operators of commercial treaters should wear nonporous gloves and aprons. Some persons are much more susceptible to skin injury than others.

TREATED SEED IS POISONOUS AND THEREFORE SHOULD NOT BE FED NOR DISPOSED OF TO OIL MILLS.

Commercial Seed Treatment and Delinting

Much cottonseed is now being sold already treated by seedsmen and others. Ginners have an excellent opportunity to perform this service for their growers at a profit. In some instances enterprising individuals have mounted treating machines on trucks and gone from farm to farm treating seed at a fixed charge per bushel. A few have provided a service that combines mechanical delinting and seed disinfection.

Satisfactory power-driven automatic cottonseed-treating machines that will handle up to sixty 100-pound sacks an hour are available on the market for large users of seed and for those offering seed-treating services (fig. 3).

In operating these machines careful adjustment and checking of the dust-feeding devices should be made to see that the correct dosage is being given. The seed hopper in these machines should not be allowed to run empty, as the dust continues to be delivered as long as the machine is running and excessive amounts will be picked up with the next lot of seed run through.

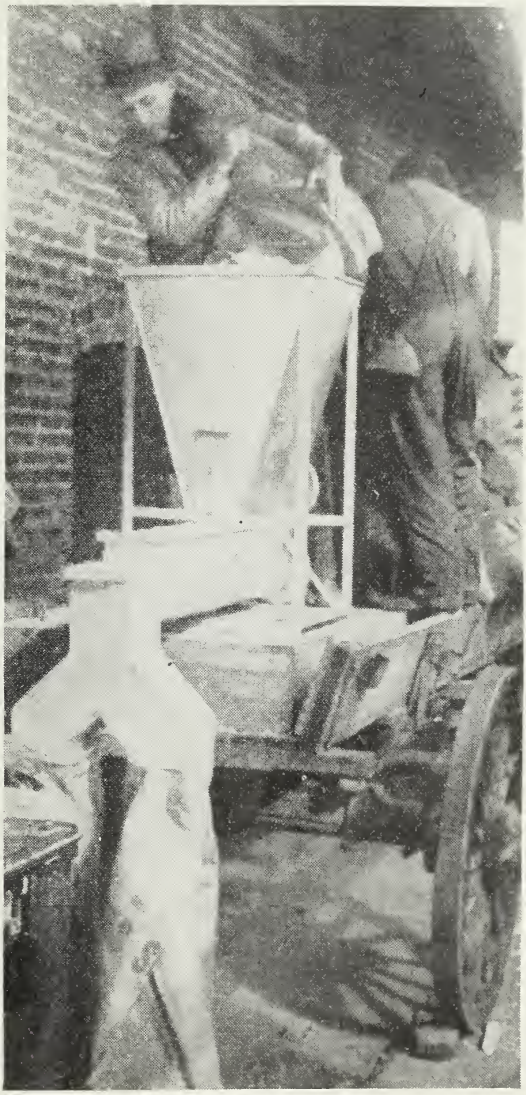

Figure 3.—Large-capacity automatic cottonseed treater in operation.

Partial or complete removal of linters and fuzz from cottonseed before planting is often beneficial and is a growing practice. In the States from Texas and Oklahoma westward, acid treatments are used. These disinfect the seed and take off all the lint. In the eastern Cotton Belt States mechanical delinting is more popular. This is frequently done at oil mills using the delinting gins that are a part of the regular equipment. This process removes most but not all of the lint and in so doing takes off some of the parasitic fungi. Mechanically delinted seed can be planted easier and better and germinates more rapidly than fuzzy seed. Added benefits because of seed disinfection and protection are usually obtained by giving delinted seed the same chemical dust treatments described in this leaflet, using a dosage of 4 ounces of 2-percent ethyl mercuric chloride or 3 ounces of 5-percent ethyl mercuric phosphate per 100 pounds of delinted seed.

Commercial delinting, grading, and chemical treatment of cottonseed fits in well with the one-variety-community movement. It is a service that can be rendered by ginners, oil-mill operators, and others to help insure satisfactory cotton crops in their localities.

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